IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant(s): Petrus Maria De Greef
Serial No.: 10/533,019
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For: LINE SCANNING IN A DISPLAY

Group Art Unit: 2629
Confirmation No. 1683
Examiner: Abdin, Shaheda A.

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Commissioner for Patents
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BRIEF ON APPEAL

Sir/Madam:

This brief is in furtherance of Applicant's Notice of Appeal filed on June 5, 2009, appealing the decision of the Examiner dated March 5, 2009 finally rejecting claims 1, 2, 5-10 and 13-18.

I. Real Party in Interest

The real party in interest in this appeal is NXP B.V., High Tech Campus 60, 5656 AG Eindhoven, The Netherlands.

II. Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

III. Status of Claims

Claims 1-18 were originally filed on April 27, 2005. In response to the Office Action of July 30, 2007, claims 3 and 11 were canceled, claims 1, 10 and 18 were amended, and new claims 19 and 20 were added. In response to the Final Office Action of January 24, 2008, claims 4, 12, 19 and 20 were canceled, and claims 1, 10 and 18 were further amended. Claims 1, 2, 5-10 and 13-18 stand finally rejected and form the subject matter of the present appeal.

Claims 1 and 5-9 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,924,824 ("Adachi et al."). Claim 2 stands rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Adachi et al. in view of U.S. Patent Application No. US 2002/0105510 A1 ("Tsuchiya"). Claims 10 and 13-18 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Adachi et al. in view of U.S. Patent No. 5,844,534 ("Okumura et al.").

This Appeal is made with regard to pending claims 1, 2, 5-10 and 13-18.

IV. Status of Amendments

No amendments were filed subsequent to final rejection.

V. Summary of Claimed Subject Matter

The claimed invention includes a method of scanning lines in a display (36) within a frame, where driving luminance information provided to the display for each pixel within the frame is divided into subfields (See lines 13-15 on page 2 of the Specification), a device (45) for scanning a number of lines in a display within a frame using luminance values within a frame (See lines 26-27 on page 2 of the Specification), and a portable device (34) having a display (See line 9 on page 3 of the Specification).

According to an embodiment, as recited in the independent claim 1, a method of scanning lines in a display (36) within a frame, where driving luminance information provided to the display for each pixel within the frame is divided into subfields (See lines 13-15 on page 2 of the Specification), includes the steps of selecting subfields to be used when scanning lines in a set of scanning cycles equivalent to the number of subfields existing for driving the pixels (See lines 21-30 on page 9 of the Specification), scanning the lines consecutively for the set of scanning cycles (See line 1 on page 10 of the Specification), and varying the selection of subfield from line to line in each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively (See lines 6-19 on page 10 of the Specification), the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle (See Fig. 9), no two consecutive line scans use the same subfield (See Fig. 9) and no line is scanned using the same subfield twice during the set of scanning cycles (See Fig. 9), such that image flicker caused by the subfields is reduced.

According to an embodiment, as recited in the independent claim 10, a device (45) for scanning a number of lines in a display (36) within a frame using luminance values within a frame comprises at least one conversion unit (56) for converting received luminance values into driving luminance information including subfields consecutively (See lines 1-5 on page 8 of the Specification), and supplying the subfields to a line driving unit (52) (See lines 6-8 on page 8 of

the Specification), a line driving unit arranged to scan each line consecutively with the luminance information of each pixel on the display in a number of scanning cycles equivalent to the number of subfields existing for driving the pixels consecutively (See lines 8-12 on page 8 of the Specification), and a control unit (58) arranged to provide variation of the selection of subfield from line to line for each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively (See lines 6-19 on page 10 of the Specification), the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle (See Fig. 9), no two consecutive line scans use the same subfield (See Fig. 9) and no line is scanned using the same subfield twice during the set of scanning cycles (See Fig. 9), such that image flicker caused by the different sizes of the subfields is reduced

According to an embodiment, as recited in the independent claim 18, a portable electronic device (45) comprises a display (36), at least one conversion unit (56) for converting received luminance values into driving luminance information including subfields and supplying the subfields to a line driving unit (52) (See lines 6-8 on page 8 of the Specification), a line driving unit arranged to scan each line consecutively with the luminance information of each pixel on the display in a number of scanning cycles equivalent to the number of subfields existing for driving the pixels consecutively (See lines 8-12 on page 8 of the Specification), and a control unit (58) arranged to provide variation of the selection of subfield from line to line for each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively (See lines 6-19 on page 10 of the Specification), the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle (See Fig. 9), no two consecutive line scans use the same subfield (See Fig. 9) and no line is scanned using the same subfield twice during the set of scanning cycles (See Fig. 9), such that image flicker caused by the different sizes of the subfields is reduced

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1 and 5-9 are anticipated under 35 U.S.C. §102(e) by Adachi et al.

Whether claims 2, 10 and 13-18 are unpatentable under 35 U.S.C. §103(a) over Adachi et al. in view of Tsuchiya or Okumura et al.

VII. Argument

In the Final Office Action of March 5, 2009, the Examiner rejected claims 1 and 5-9 under 35 U.S.C. §102(e) as allegedly being anticipated by Adachi et al. In addition, the Examiner rejected claim 2 under 35 U.S.C. §103(a) as allegedly being unpatentable over Adachi et al. in view of Tsuchiya. Furthermore, the Examiner rejected claims 10 and 13-18 under 35 U.S.C. §103(a) as allegedly being unpatentable over Adachi et al. in view of Okumura et al.

However, the cited reference of Adachi et al. fails to disclose each claimed element of the independent claims 1, 10 and 18, which are also not disclosed or suggested in the cited reference of Okumura et al. Thus, the independent claim 1 is not anticipated by Adachi et al. under 35 U.S.C. §102(e) and the independent claims 10 and 18 are not obvious over Adachi et al. in view of Okumura et al.

A. Rejection of Independent Claim 1 Under 35 U.S.C. §102(e)

The independent claim 1 was rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Adachi et al. However, the cited reference of Adachi et al. fails to disclose each claimed element of the independent claim 1. Thus, the independent claim 1 is not anticipated by Adachi et al. under 35 U.S.C. §102(e).

The independent claim 1 recites in part "*varying the selection of subfield from line to line in each scanning cycle such that the subfields are selected in a*

consecutive order from line to line as the lines are scanned consecutively, the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle, no two consecutive line scans use the same subfield and no line is scanned using the same subfield twice during the set of scanning cycles," which is not disclosed in the cited reference of Adachi et al. Thus, the independent claim 1 is not anticipated by the cited reference of Adachi et al.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The Final Office Action of March 5, 2009 states on page 9 that the cited reference of Adachi discloses "no two consecutive line scans use the same subfield (e.g. Fig. 5 shows line 2nd scans use SF1, but SF4 is scanned in line 3rd)." Applicant respectfully disagrees with this assertion.

On the scan line 1 ("line 2nd") in Fig. 5(d) of Adachi et al., there are sub-frames SF1, SF2, SF3 and SF4. On the scan line 2 ("line 3rd") in Fig. 5(d) of Adachi et al., there is only the sub-frame SF4. However, as shown in Fig. 5(b), the scan line 2 further includes the sub-frames SF1, SF2 and SF3. Fig. 5(d) is a continuation of Fig. 5(b), as explained in column 9, lines 24-30, with respect to Figs. 3(b) and 3(d). Thus, the scan lines shown in Fig. 5(b) are the same scan lines shown in Fig. 5(d). Consequently, the scan line 1 includes the sub-frames SF1, SF2, SF3 and SF4 and the scan line 2 also includes the sub-frames SF1, SF2, SF3 and SF4. Clearly, the scan lines 1 and 2 use the same sub-frames, i.e., the sub-frames SF1, SF2, SF3 and SF4. In fact, any two consecutive scan lines in Figs. 5(b) and 5(d) use at least one common sub-frame. As an example, Fig. 5(d) clearly shows that both the scan lines 13 and 14 use the same sub-frame SF2. Consequently, the cited reference of Adachi et al. fails to disclose the limitation of "*varying the selection of subfield from line to line in each scanning cycle such that... no two consecutive line scans use the same subfield*," as recited in the

independent claim 1.

In addition, the Office Action on page 9 states that the cited reference of Adachi discloses that "the subfields (i.e. SF1 and SF4, Fig. 5d) of two consecutive lines (e.g. 1 and 2) do not overlap with respect to the time during each scanning cycle (column 9, lines 48-53)." Applicant respectfully disagrees with this assertion as well.

As shown in Fig. 5(d), the sub-frame SF1 of the scan line 1 clearly overlaps with the sub-frame SF4 of the scan line 2. The sub-frame SF1 of the scan line 1 occupies the time blocks 36 and 37. The sub-frame SF4 of the scan line 2 also occupies the time blocks 36 and 37. Thus, the sub-frame SF1 of the scan line 1 overlaps with the sub-frame SF4 of the scan line 2 during the time blocks 36 and 37. In fact, any two consecutive scan lines in Figs. 5(b) and 5(d) have sub-frames that overlap with respect to time. As an example, Fig. 5(d) clearly shows that the sub-frame SF4 of the scan line 0 overlaps the sub-frame SF1 of the scan line 1 with respect to time. Consequently, the cited reference of Adachi et al. fails to disclose the limitation of "*varying the selection of subfield from line to line in each scanning cycle such that...the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle*," as recited in the independent claim 1.

Since the cited reference of Adachi et al. does not disclose the claim limitations with respect to "*no two consecutive line scans use the same subfield*" and "*the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle,*" the independent claim 1 is not anticipated by the cited reference of Adachi et al.

B. Rejection of Independent Claims 10 and 18 Under 35 U.S.C. §103(a)

The independent claims 10 and 18 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Adachi et al. in view of Okumura et al. However, contrary to Examiner's assertion, the cited reference of Adachi et al.

fails to teach some claim limitations of the independent claim 1. Thus, the independent claims 10 and 18 are not obvious over Adachi et al. in view of Okumura et al.

With respect to the independent claims 10 and 18, the Examiner on page 6 asserts that Adachi et al. teaches "the subfields (i.e. SF1 and SF4, Fig. 5d) of two consecutive lines (e.g. 1 and 2) do not overlap with respect to time during each scanning_cycle (column 9, lines 48-53) , no two consecutive line scans using the same subfield (e.g. Fig. 5 shows line 2nd scans SF1, but SF4 is canned in line 3rd)." However, as explained above in Section A with respect to the independent claim 1, Adachi et al. does not disclose these claim limitations, which are the same limitations found in the independent claim 10 and 18.

Therefore, the device as recited in the independent claim 10 and the portable electronic device as recited in the independent claim 18 cannot be derived even if the teachings of Adachi et al. and Okumura et al. are combined. Thus, the independent claims 10 and 18 are not obvious over Adachi et al. in view of Okumura et al.

C. Rejection of Dependent Claims 2, 5-9 and 13-17 Under 35 U.S.C. §103(a)

Each of the dependent claims 2, 5-9 and 13-17 depends on one of the independent claims 1 and 10. As such, these dependent claims include all the limitations of their respective base claims. Thus, these dependent claims are patentable for at least the same reasons as their respective base claims.

SUMMARY

The independent claim 1 is not anticipated by Adachi et al. under 35 U.S.C. §102(e) because Adachi et al. fails to disclose "*varying the selection of subfield from line to line in each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively, the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle, no two consecutive line scans use the same subfield and no line is scanned using the same subfield twice during the set of scanning cycles,*" as recited in the amended independent claim 1. The independent claim 10 and 18 are not obvious over Adachi et al. in view of Okumura et al. under 35 U.S.C. §103(a) because the claimed inventions cannot be derived even if the teachings of Adachi et al. and Okumura et al. are combined since Adachi et al. does not in fact teach some of the claimed limitations. The dependent claims 2, 5-9 and 13-17 are also not obvious over Adachi et al. in view of Tsuchiya or Okumura et al. since these dependent claims include all the limitations of their respective base claims 1 and 10.

For all the foregoing reasons, it is earnestly and respectfully requested that the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1, 2, 5-10 and 13-18, so that this case may be allowed and pass to issue in a timely manner.

Respectfully submitted,
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VIII. Claims Appendix

1. Method of scanning lines in a display within a frame, where driving luminance information provided to the display for each pixel within the frame is divided into subfields, the method including the steps of:

selecting subfields to be used when scanning lines in a set of scanning cycles equivalent to the number of subfields existing for driving the pixels,

scanning the lines consecutively for the set of scanning cycles, and

varying the selection of subfield from line to line in each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively, the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle, no two consecutive line scans use the same subfield and no line is scanned using the same subfield twice during the set of scanning cycles, such that image flicker caused by the subfields is reduced.

2. Method according to claim 1, wherein a scan of a line includes applying an RMS voltage corresponding to a value of the subfield to a pixel.

5. Method according to claim 1, wherein the subfields have varying lengths.

6. Method according to claim 1, wherein the subfields are subframes provided according to a frame length control scheme.

7. Method according to claim 1, wherein the subfields are subframes provided according to a frame rate control scheme.

8. Method according to claim 1, wherein the subfields are provided according to a pulse width modulation scheme.

9. Method according to claim 1, wherein the subfields are provided according to a combination of schemes listed in claims 5, 6 and 7.

10. Device for scanning a number of lines in a display within a frame using luminance values within a frame and comprising:

at least one conversion unit for converting received luminance values into driving luminance information including subfields, and supplying the subfields to a line driving unit,

a line driving unit arranged to scan each line consecutively with the luminance information of each pixel on the display in a number of scanning cycles equivalent to the number of subfields existing for driving the pixels, and

a control unit arranged to provide variation of the selection of subfield from line to line for each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively, the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle, no two consecutive line scans use the same subfield and no line is scanned using the same subfield twice during the set of scanning cycles, such that image flicker caused by the different sizes of the subfields is reduced.

13. Device according to claim 10, wherein the subfields have differing lengths.

14. Device according to claim 10, wherein the subfields are provided as subframes according to a frame length control scheme.

15. Device according to claim 10, wherein the subfields are provided as subframes according to a frame rate control scheme.

16. Device according to claim 10, wherein the subfields are provided according to a pulse width modulation scheme.

17. Device according to claim 10, wherein the subfields are provided according to a combination of schemes listed in claims 13, 14 and 15.

18. Portable electronic device comprising:

a display,

at least one conversion unit for converting received luminance values into driving luminance information including subfields and supplying the subfields to a line driving unit,

a line driving unit arranged to scan each line consecutively with the luminance information of each pixel on the display in a number of scanning cycles equivalent to the number of subfields existing for driving the pixels, and

a control unit arranged to provide variation of the selection of subfield from line to line for each scanning cycle such that the subfields are selected in a consecutive order from line to line as the lines are scanned consecutively, the subfields of two consecutive lines do not overlap with respect to time during each scanning cycle, no two consecutive line scans use the same subfield and no line is scanned using the same subfield twice during the set of scanning cycles, such that image flicker caused by the different sizes of the subfields is reduced.

IX. Evidence Appendix

NONE

X. Related Proceedings Appendix

NONE